Claims

1. Device for protecting electronic modules (µC, C-T, T2), in particular electronic modules disposed in a control device (ST) for controlling low-power consumers or for processing/transmitting data, in a multi-voltage on-board electrical system (12V/42V) with a first battery (BAT1) of the low on-board electrical system voltage (Vbat1), against short circuits to the high on-board electrical system voltage, with a MOSFET transistor (T1), the drain source path (D-S) of which is inserted between the control device connection (A, A1, A2) and the connection (E, E1, E2) of the electronic module (µC, C-T, T2), with the source connection (S) of the transistor (T1) being connected to the connection (E, E1, E2) of the electronic module (µC, C-T, T2) and its drain connection (D) being connected to the control device connection (A, A1, A2), with a Zener diode (D1) being disposed between the gate connection (G) and the source connection (S) of the transistor (T1) and a gate resistor (Rv) being disposed between the gate connection (G) of the transistor (T1) and the positive pole (+Vbat1) of the battery (Bat1),

characterised in that

a diode (D2) is connected parallel to the gate resistor (Rv), conducting current in the direction from the gate connection (G) to the positive pole (+Vbat1) of the battery (Bat1).

2. Device according to claim 1, characterised in that the breakdown voltage (Vz) of the Zener diode (D1) is selected to be lower than the maximum permitted gate source voltage (Vgs)

of the transistor (T1).

3. Device according to claim 1, characterised in that in the event of a short circuit to the highest voltage occurring in the on-board electrical system active at the device connection (A, A1, A2), the source voltage (Vs) of the transistor (T1) is limited to a value Vs = Vbat1 - Vth of the low on-board voltage (Vbat1) minus the threshold voltage (Vth) of the transistor (T1).

4. Device according to claim 1, characterised in that in the case of a short circuit to the highest voltage occurring in the on-board electrical system active at the device connection (A, A1, A2), the diode (D2) parallel to the gate resistor (Rv) limits the gate voltage (Vg) of the transistor (T1) to a value Vg = Vbat1 + Vd of the low on-board voltage (Vbat1) plus the conducting state voltage (Vd) of the diode (D2).

5. Device according to one of the preceding claims, characterised in that the protective circuit (Ss, Ssa, Ssb) is integrated in an ASIC.

6. Device according to claim 1, characterised in that the multi-voltage on-board electrical supply is integrated in a vehicle.